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Nota di contenuto	1. Basic Equations for Wave Processes in Fluids and Solids -- 1.1 Sound in Layered Fluids -- 1.2 Harmonic Waves -- 1.3 Elastic Waves in Isotropic Solids -- 2. Plane Waves in Discretely Layered Fluids -- 2.1 Inhomogeneous Plane Waves. Energy of Sound Waves -- 2.2 Reflection at the Interface of Two Homogeneous Media -- 2.3 Locally Reacting Surfaces -- 2.4 Reflection from a Plane Layer -- 2.5 Reflection and Transmission Coefficients for an Arbitrary Number of Layers -- 2.6 Moving Layers. Impedance of Harmonic Waves in Moving Media -- 3. Monochromatic Plane-Wave Reflection from Continuously Layered Media -- 3.1 General Relations -- 3.2 Solvable Profiles k(z) from the Confluent Hypergeometric Equation -- 3.3 Solvable Profiles Obtained from the Hypergeometric Equation -- 3.4 Plane-Wave Reflection from an Epstein Layer -- 3.5 Reflection of a Plane Wave from a Half-Space with a Linear Law for the Squared Refraction Index -- 3.6 Other Cases

with Exact Solutions for Normal Incidence -- 3.7 Exact Solutions for Media with Continuous Stratification of Sound Velocity, Density, and Flow Velocity -- 4. Plane-Wave Reflection from the Boundaries of Solids -- 4.1 Plane Waves in Elastic Half-Spaces with a Free Boundary -- 4.2 Reflection from Solid-Solid and Solid-Fluid Interfaces -- 4.3 Reflection from a System of Solid Layers -- 4.4 Surface and “Leaky” Waves -- 5. Reflection of Sound Pulses -- 5.1 General Relations. Law of Conservation of Integrated Pulse -- 5.2 Change of Pulse Shape upon Total Internal Reflection from a Boundary Between Two Homogeneous Media -- 5.3 Total Reflection of a Pulse in Continuously Layered Media -- 6. Universal Properties of the Plane-Wave Reflection and Transmission Coefficients -- 6.1 Symmetry with Respect to Reversion of the Wave Path -- 6.2 Analytic Properties -- 6.3 Nonreflecting Layers -- 7. Acoustic Waves in Absorbing Anisotropic Media -- 7.1 Absorption of Sound -- 7.2 Anisotropic Elastic Media. Gulyaev-Bluestein Waves -- 7.3 Elastic Properties of Finely Layered Media -- 8. Geometrical Acoustics. WKB Approximation -- 8.1 The WKB Approximation and Its Range of Validity -- 8.2 Physical Meaning of the Approximate Solutions -- 8.3 Another Approach to the Ray Acoustics Approximation -- 9. The Sound Field in the Case of Turning Horizons and Resonance Interaction with a Flow -- 9.1 Reference Equation Method -- 9.2 Sound Field in the Vicinity of a Turning Point -- 9.3 Reflection from a “Potential Barrier” -- 9.4 Amplification of Sound in an Inhomogeneous Flow -- 10. Sound Reflection from a Medium with Arbitrarily Varying Parameters -- 10.1 Differential Equations for Reflection Coefficient and Impedance of a Sound Wave -- 10.2 Reflection from a Thin Inhomogeneous Layer -- 10.3 Method of Successive Approximations for Weakly Reflecting Layers -- 10.4 Reflection at Interfaces in Continuously Layered Media -- References.

Sommario/riassunto

This monograph is devoted to the systematic presentation of the theory of sound- wave propagation in layered structures. These structures can be man-made, such as ultrasonic filters, lenses, surface-wave delay lines, or natural media, such as the ocean and the atmosphere, with their marked horizontal stratification. A related problem is the propagation of elastic (seismic) waves in the earth's crust These topics have been treated rather completely in the book by L. M. Brek- hovskikh, Waves in Layered Media, the English version of the second edition of which was published by Academic Press in 1980. Due to progress in experimental and computer technology it has become possible to analyze the influence of factors such as medium motion and density stratification upon the propagation of sound waves. Much attention has been paid to propagation theory in near-stratified media, Le. , media with small deviations from strict stratification. Interesting results have also been obtained in the fields of acoustics which had been previously considered to be "completely" developed. For these reasons, and also because of the inflow of researchers from the related fields of physics and mathematics, the circle of persons and research groups engaged in the study of sound propagation has rather expanded. Therefore, the appearance of a new summary review of the field of acoustics of layered media has become highly desirable. Since Waves in Layered Media became quite popular, we have tried to retain its positive features and general structure.